

Lake Michigan Lakewide Management Plan 2006 Status Report

Introduction

The purpose of this Lakewide Management Plan (LaMP) 2006 status report is to provide:

- An executive summary of the status of the Lake Michigan ecosystem;
 - A report on the progress in achieving the Lake Michigan LaMP goals and examples of significant activities completed in the past two years since LaMP 2004;
 - A summary of the current Lake Michigan mass balance data, findings, and model runs;
 - Links to more detailed information in LaMP 2000, 2002, 2004 or other sources;
 - An opportunity to comment on targets and plans for pollution reduction and ecosystem restoration;
 - An opportunity to identify additional pollutants to be addressed by the LaMP in the future; and
 - An overview of the 33 major sub-watersheds that flow into Lake Michigan, and their status.
 - A status report on Lake Michigan Areas of Concern (AOCs).
- ocean fish pointing to a problem of global proportions.
 - Climatic pattern changes, whether temporary or permanent, help focus attention about groundwater levels and lake/groundwater interaction and diversion.
 - Terrestrial and aquatic animals appear to be rebounding with eagles nesting on the southern shore of Lake Michigan for the first time in 100 years, abundance of wolves lead to proposals to delist it from the endangered list, and a lakewide effort on restocking sturgeon is underway.
 - Following the September 11, 2001 terrorist attacks, the issue of protecting the lake's vast supply of fresh drinking water has become a higher priority.

What is the Status of the Lake?

"Lake Michigan is an outstanding natural resource of global significance, under stress and in need of special attention." LaMP 2000

Since the release of LaMP 2000, several key indicators point to the continuing concern for the health of the ecosystem.

- Beach season data exhibited a continued number of beach closings.
- Data reveal that a critical layer of the Lake Michigan aquatic food web continues to disappear, and with the discovery of new aquatic nuisance species—there are now a total of 180 (up from 170 4 years ago) in the Great Lakes ecosystem—the integrity of the food web of Lake Michigan is in question.
- Mercury in fish is such a prevalent problem that 44 states now have mercury fish advisories, and a national advisory has been issued for certain



The Lake Michigan-Mississippi River basin divide:
Chicago Avenue west of East Avenue in Oak Park,
Illinois.

- Ten AOCs still in various stages of remediation are working on delisting target setting.

Despite these concerns, Lake Michigan supports many beneficial uses. For example, it provides drinking water for 10 million people; has internationally significant habitat and natural features; supports food production and processing; supplies fish for food, sport, and culture; has valuable commercial and recreational uses; and is the home of the nation's third-largest population center. Furthermore, significant progress is being made to remediate the legacy of contamination in the basin. Specifically, ongoing actions to restore the AOCs have been successful and have received new resources from the passage of the 2002 Great Lakes Legacy Act. Their status is outlined in Chapter 7. The Lake Michigan Watershed Academy was launched in four states and has brought together the regional planning agencies for the first time to align their work with Lake Michigan trends and Phase 2 of this work is underway.

Background on the LaMP

Under the Great Lakes Water Quality Agreement (GLWQA), as amended in 1987, the United States and Canada agreed "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem." To achieve this objective, the parties agreed to develop and implement, in consultation with state and provincial governments, LaMPs for open waters and remedial action plans for contaminated AOCs. In the case of Lake Michigan, the only one of the Great Lakes wholly within the borders of the United States, the Clean Water Act (Section 118c) holds the U.S. Environmental Protection Agency (USEPA) accountable for the LaMP.

Work on the Lake Michigan LaMP began in the early 1990s with a focus on critical pollutants affecting the lake. At that time, monitoring data showed that point source regulatory controls established in the 1970s and 1980s were reducing the levels of persistent toxic substances such as polychlorinated biphenyls (PCB), DDT, and other pesticides. Monitoring results also indicated that nonpoint sources of pollution such as runoff and air deposition, as well as aquatic nuisance species, were stressing the Lake Michigan ecosystem. LaMP 2000 states that "pathogens, fragmentation and destruction of terrestrial and aquatic habitats, aquatic nuisance species, uncontrolled runoff and

erosion are among the stressors contributing to ecosystem impairments."

Increased water quality protection for the Great Lakes watershed is now being implemented with the adoption of more stringent water quality standards for the Great Lakes basin drainage by each Great Lakes state, with the goal of having the new standards reflected in all permits by 2006.

What remains is a set of difficult, persistent, and multifaceted problems. In response, agencies must develop new tools, refocus their strategies and methods, and continually obtain new data. LaMP 2004 and 2006 recommend using a watershed framework as the most effective scale and structure for working on these problems and provided draft fact sheets for the 33 major Lake Michigan watersheds. Updated versions are provided in Chapter 12.

Linking LaMP Goals to RAPs

Remedial Action Plans (RAP) for Lake Michigan Areas of Concern

The GLWQA amendments of 1987 also called for the development of RAPs for specific Area of Concern. The two Federal governments were directed to cooperate with the state and provincial governments to develop and implement RAPs. The RAPs and LaMPs are similar in that they both use an ecosystem approach to assessing and remediating environmental degradation of the 14 beneficial use impairments outlined in GLWQA, Annex 2, and rely on a structured public involvement process. RAPs, however, encompass a much smaller geographic area, concentrating on an embayment or stretch of a river within a single watershed with contaminated sediments leading to fish advisories.

Forging a strong relationship between the LaMPs and RAPs is important to the success of both efforts. The RAPs serve as point source discharges to the lake as a whole. Improvements in the AOC areas will eventually help improve the entire lake. Much of the expertise and land use control of use impairments, possible remedial efforts and watershed planning reside at the local level. Cooperation between the two efforts is essential in order for LaMPs to remove lakewide impairments and for the RAP watershed to be able to restore integrity. The State of Michigan, with 14 AOCs,

has developed, and USEPA has approved, methodologies for setting delisting targets for beneficial use impairments.

LaMP 2000, 2002, and 2004: How and by whom are they used?

The publication of LaMP 2000 documented the beginning of a basinwide dialogue on which pollutants and stressors should be prioritized for control, what reduction targets should be applied to them, and which ecologically rich areas should be identified for restoration and protection. Some issues, such as aquatic nuisance species, legacy sites, and drinking water protection, require immediate



Door County, Wisconsin, Lake Michigan Lakeshore
Photograph by Karen Holland, USEPA

attention. Other issues continue to be the subject of public dialogue, and new issues may arise that require additional research. In 2000, the GLWQA Binational Executive Committee determined that an adaptive management approach would guide the LaMP process, making it an iterative approach. LaMP 2006 provides new information since 2004, responds to input received, and provides targets, objectives, and strategies.

The LaMP provides both a lakewide view and local information about each AOC and watershed. The LaMP partners are facilitating watershed literacy efforts, many RAP groups have taken the steps to become watershed groups where the expertise and energy can continue to lead stewardship activities.

What was Accomplished and What Challenges Remain?

Issues that were highlighted in LaMP 2000, 2002 and 2004 that have been accomplished include the following:

- Collaborative monitoring of the basin in 2005
- Setting targets for reduction of critical pollutants and stressors (see Chapter 7 and Chapter 4),
- Reviewing the LaMP list of contaminants and stressors
- Filling data gaps, including the Lake Michigan Mass Balance Project (see Chapter 7),
- Identifying ecologically rich areas and habitats (see Chapter 4 and Chapter 12)
- Developing the concept of sustainability and stewardship (see Chapter 6 and Chapter 9)
- Convening public conferences and workshops for beach management, monitoring issues, and watershed management (see Chapter 1, Chapter 4, and Chapter 12)
- Further developing remedial action plans and developing delisting targets

Progress made on accomplishing these objectives is outlined in this status report.

Areas of LaMP Work that Remain a Challenge

Finalization of a monitoring plan and prioritization of indicators are still in progress. A draft monitoring plan was issued along with a set of recommendations in August 2000. To prioritize indicators and gather missing data, two major Great Lakes wide initiatives have begun that are focused on wetlands and the importance of the "coastal area." The results of these efforts are providing not only new data but also refined indicators for wetlands.

One of the key functions of the LaMP process is to identify pollutants that are or have the potential to adversely affect the Lake Michigan ecosystem. In Appendix A, the process for identifying three categories of Lake Michigan LaMP pollutants on a geographic basis was outlined:

- Critical pollutants,
- Pollutants of concern, and
- Watch List pollutants.

Table i-1: Status of LaMP Pollutants Proposed in LaMP 2002-2004
(For more information on 2006 proposals and pending definitions, see Appendix A)

	Lake Michigan LaMP Pollutants Proposed in LaMP 2002	Lake Michigan LaMP Pollutants in LaMP 2004
Critical Pollutants	PCBs, chlordane, DDT/DDE, mercury, dioxin	PCBs, chlordane, DDT/DDE, mercury, dioxin
Pollutants of Concern	PAHs, lead, cadmium, chromium, copper, zinc, arsenic, cyanide, endrin, heptachlor epoxide, lindane, nickel, nutrients, pathogens, sediments	PAHs, lead, cadmium, chromium, copper, zinc, arsenic, cyanide, endrin, heptachlor epoxide, lindane, nickel, nutrients (a category which includes phosphorus), pathogens, sediments
Pollutant Watch List	atrazine, selenium, PCB substitute compounds	atrazine, selenium, PCB substitute compounds

LaMP 2004 finalized the critical pollutants, pollutants of concern, and watch list pollutants that were proposed in LaMP 2002. (See Table i-1). In addition, pollutants in each category were proposed for finalization in LaMP 2006. See Appendix A from LaMP 2004, especially Table A.6. A more detailed discussion of the LaMP pollutant identification process is provided in Appendix A.

In addition, a list of the pollutants that were proposed for these categories in LaMP 2002 and were made final in LaMP 2004 (see Table 1-1). Information for a new set of Watch List pollutants for LaMP 2004 was also provided in LaMP 2004's Appendix A. The terms "proposed" and "final" are relative and are terms of convenience. There will not be a truly final list of Lake Michigan LaMP pollutants until the LaMP adaptive management process changes or pollutant-caused impairments are remediated. Work on the LaMP pollutants adaptive management process will be the focus of the SOLEC conference lake Michigan workshop, November 2, 2006 in Milwaukee, Wisconsin.

A Focus on the Future: Sustainability and Stewardship

While partnerships can leverage resources, they also must be led and supported. Setting shared goals, objectives, and indicators in alignment helps to conserve resources but does not do away with resource needs. The interdependencies inherent in the ecosystem approach require a balance among three fundamental elements: environmental integrity, economic vitality, and sociocultural well-

being. The ability of these elements to function in balance over time is one measure of sustainability. Complex ecological processes link organisms and their environment. These processes are often referred to as "ecological services" because they perform functions that combine to sustain life in the ecosystem. The significant natural features of Lake Michigan, such as its encompassing the world's largest collection of freshwater sand dunes, supporting 43 percent of the Great Lakes' large sport fishing industry, and providing drinking water for over 10 million residents, means billions of dollars not only to the economies of the four states that share the lake but also to the nation as a whole (see Chapter 5 and Chapter 6).

With that in mind, the nomenclature for the "meter" box at the start of each chapter has changed. It has changed from "poor to good" to "not sustainable to sustainable". This requires more discussion to further define these terms.

A Focus on Ecosystems and Watersheds

In 1995, the Federal Interagency Ecosystem Management Task Force defined an ecosystem as "an interconnected community of living things, including humans, and the physical environment with which they interact. As such, ecosystems form the cornerstone of sustainable economies." With regard to ecosystem management, the Task Force explained that "the goal of the ecosystem approach is to restore and maintain the health, sustainability, and biological diversity of ecosystems

while supporting sustainable economies and communities. Based on a collaboratively developed vision of desired future conditions, the ecosystem approach integrates ecological, economic, and social factors that affect a management unit defined by ecological—not political—boundaries.”

In response to the changing dynamic of environmental management, the Lake Michigan Management Committee adopted the ecosystem approach in 1998. The significance for the Lake Michigan LaMP was the intent to address not only the 10 areas that had been formally designated AOCs by the 1987 GLWQA amendments, but also other areas that were responsible for impairing the lake’s ecosystem. The prime example was the Chicago area. Because of the rerouting of the Chicago River into the Mississippi River system, Chicago’s surface water has been diverted out of the basin; however, groundwater from the Chicago area has not been diverted, and the city’s large airshed has been shown to be a source of pollutants that are deposited in and affect the lake. The watershed/diversion connection is currently critical as steps are underway to prevent invasive or aquatic nuisance species from entering the Lake from the Mississippi River system (See chapter 8).

A Focus on Partnerships, Innovation, and Shared Information

In order to address the goals of a broad-based ecosystem approach requires a new management framework. As LaMP 2000 pointed out, the framework is based on “partnerships of organizations brought together to solve problems too large or complex to be dealt with by one agency with a limited mission. This approach also has the potential to leverage and direct local, state and federal, and private resources into a coordinated effort. The challenge is to create the framework for participating organizations to contribute their expertise and resources, often on an uneven basis, but in a manner that allows all partners to participate in the decision making on an even basis” (see chapter 10).

LaMP 2006 Data and Information

A key to engaging the necessary partners is a common, accessible, and scientifically sound body of knowledge. Lake Michigan protection and

restoration requires open dialogue between academia and government agencies, as well as a collaborative monitoring plan to provide a current database. Reporting of current data and conclusions to the public is an important component of this system. This component presents many challenges, as data quality plans improve data accuracy but hinder the speed of reporting. Current management decisions are often made with gaps in both data and interpretation. These gaps may lead to incorrect problem assessments or incorrect response actions. The Lake Michigan LaMP has



Yellow Moccasin, Gibson Woods, Indiana
Photography by Karen Holland, USEPA

formed a basinwide coordinating and monitoring council to coordinate and promote common protocols and comparability in monitoring. The goal is to facilitate data sharing across agencies as well as among academic and research disciplines. Lake Michigan as a studied object is a moving target, and to provide adaptive management, there is a continuing need for monitoring and reporting of the lake’s current status (see chapter 11 and Appendix A).

Most, but not all of the data used has been peer reviewed in its original development. The use in the LaMP is considered secondary data. New data is provided by:

- Researchers who publish and present at conferences
- Researchers who receive USEPA grants provide new data and insights
- Volunteer scientists who volunteer and report on Great Lakes indicators every two years at the State of the Lakes Ecosystem Conference



- Monitoring efforts paid for by state, federal, and local governments, universities, volunteer organizations, and non-profit organizations.

Please check the web sites referenced in LaMP 2006 for primary sources.

Great Lakes Regional Collaboration

In October 2003, the Great Lakes Governors identified nine critical environmental priorities for regional action. These were adopted by the Great Lakes Mayors and the Great Lakes Commission. In May 2004, President Bush signed an Executive Order creating a Cabinet-Level task Force to bring an unprecedented level of collaboration and coordination among, State, Federal, and local governments, tribes, and other interests in the United States and Canada to accelerate protection and restoration of the Great Lakes. This led to the development and announcement of a series of recommendations from stakeholders in a final Great Lakes Regional Collaboration Report in December 2005 after a year-long process of research and consensus building.

The recommendations, while not official government policy, reflect the consensus of the wide range of stakeholders involved in the collaboration process. GLRC action items are listed at the beginning of each LaMP chapter and the goals and recommendations at the end of each LaMP chapter as information only. During the next two years, the LaMP management committee will review them and make decisions regarding whether and how they can be applied to the Lake Michigan LaMP process.

Great Lakes Water Quality Agreement Review

The governments of Canada and the United States asked the IJC to seek the public's views on how well the Great Lakes Water Quality Agreement (GLWQA) has worked so far and how effective it has been. In response, the IJC held public meetings in 14 Great

Lakes and St. Lawrence cities in Fall 2005, wrapping up its consultations with a Web Dialogue. It also received comments from individuals and organizations by hand, mail, fax, phone, e-mail and online. More than 4000 individuals and organizations took part. The review process is continuing through 2006. More information is available at www.epa.gov/glnpo/glwqa.

Organization of the LaMP and this Status Report for 2006

This document is intended to provide a status report on the health of the Lake Michigan ecosystem and a summary of the activities related to the Lake Michigan LaMP that have occurred during the last 2 years. Each chapter provides reports on current status, challenges, indicators, and next steps.

The LaMP is based upon the vision, goal and subgoals of the Lake Michigan LaMP. The vision and goal were adopted by the Management Committee August 18, 1998. The vision is:

A sustainable Lake Michigan ecosystem that ensures environmental integrity and that supports and is supported by economically viable, healthy human communities.

The LaMP goal is:

To restore and protect the integrity of the Lake Michigan ecosystem through collaborative, place-based partnerships.

Specifically, this report is organized to provide a summary status report on the subgoals identified by the Lake Michigan LaMP. These subgoals are stated as questions and are organized in 11 chapters. The last, 12th chapter, provides information on activities related to these sub-goals in the 33 subwatersheds. The chapters are as follows:

1. Can we all eat any fish?
2. Can we all drink the water?
3. Can we swim in the water?
4. Are all habitats healthy, naturally diverse, and sufficient to sustain viable biological communities?
5. Does the public have access to abundant open space, shorelines, and natural areas, and does

the public have enhanced opportunities for interaction with the Lake Michigan ecosystem?

6. Are land use, recreation, and economic activities sustainable and supportive of a healthy ecosystem?
7. Are sediment, air, land, and water sources or pathways of contamination that affect the integrity of the ecosystem?
8. Are aquatic and terrestrial nuisance species prevented and controlled?
9. Are ecosystem stewardship activities common and undertaken by public and private organizations in communities around the basin?
10. Is collaborative ecosystem management the basis for decision-making in the Lake Michigan basin?
11. Do we have enough information, data, understanding, and indicators to inform the decision-making process?
12. What is the status of the 33 Lake Michigan subwatersheds?

What Does Page One of Each Chapter Explain?

Page one of each chapter provides the current status of the goal and the 2020 target that the states and federal governments are striving to meet. It also lists the indicators that informs the status statement and the challenges and next steps that will be dealt with in the next two years.

What are the “Text” Boxes and What Do They Provide?

Throughout the document, “text” boxes are employed to portray examples of work underway in

the basin, or, in some cases, a noteworthy event. They are also used to provide details of what is being discussed in the chapter. They often contain a web address where the reader can follow up if interested. The information does not necessarily imply activity done under the auspices of the LaMP, but provides examples of how LaMP goals can be accomplished.

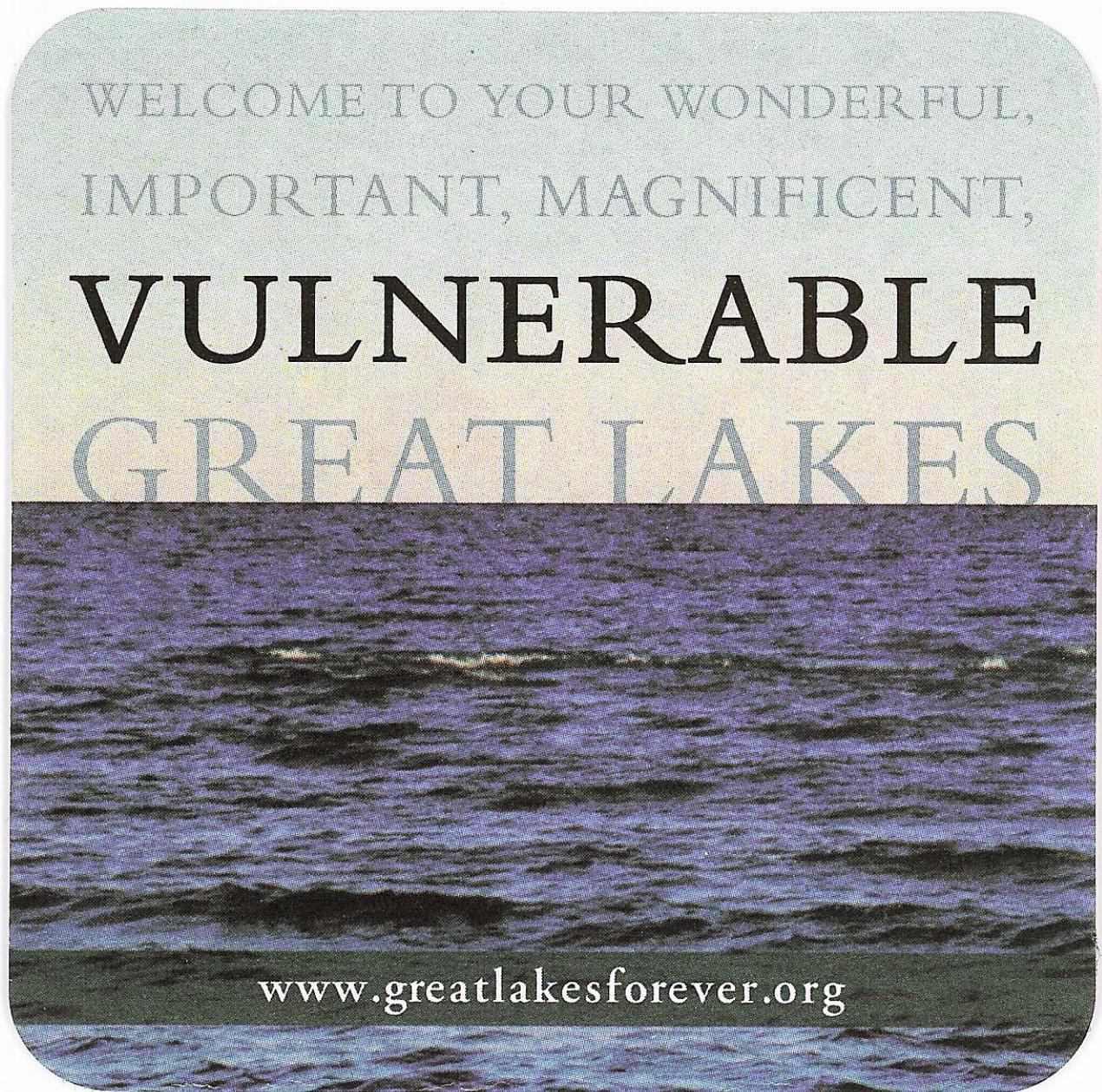
What is the “Lake Michigan Toolbox”?

The 2006 Lake Michigan LaMP document has a series of “Lake Michigan Toolboxes” that provide links to resources that can be applied to basin problems and exchange shared experiences. They are targeted to assist local government and watershed groups as they work to better manage their local ecosystems. The tools include example and model ordinances, manuals and resources for local officials, planners, developers, individual citizens, and other interested parties.



Where Can I Find LaMP 2000 and the 2002 and 2004 Status Reports? Where Do I Send Public Comments?

Lake Michigan LaMP 2000, 2002, and 2004 are available on line at www.epa.gov/glnpo/michigan.html. For a CD or printed copy of the LaMP or to make a public comment, contact the U.S. Environmental Protection Agency, Mail Code T-17J, 77 West Jackson Boulevard, Chicago, IL 60604. Public comments are factored into LaMP deliberations and will be reflected in LaMP 2008.



Great Lakes Forever Coastal Drink Coasters.
Source: www.biodiversityproject.org